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OBSERVATIONS ON THE POISONOUS NATURE OF THE WHITE-MARKED TUSSOCK-MOTH

(HEMEROCAMPA LEUCOSTIGMA SMITH AND ABBOT) *

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It seems to be the generally accepted opinion among entomologists and others, that larvae of the white-marked tussock-moth are non-poisonous and do not produce toxic reactions when accidentally brought in contact with the human skin. Some recent experience with this insect gives rather definite indications regarding its poisonous nature and opportunity is now taken to record certain observations.

During August, 1921, the writer had occasion to handle and sort a large number of cocoons of *Hemerocampa leucostigma* (= *Orgyia leucostigma*). Mr. Arthur Hertig did the work of collecting the tussock-moth cocoons from the trees on the Minnesota University campus but on the second day he had to give up this work and consult a doctor, for what we supposed must be a severe case of hives. His face, neck, and arms were covered with numerous swellings, resulting in much pain and some fever. The physician was unable to diagnose the trouble as hives, nor in fact was he able to give any good reason for this particular form of dermatitis. The doctor remarked that he had observed perhaps three other cases of a similar nature for which he was unable to ascertain the cause.

At about this point, after the writer had experienced itching and burning sensations on the forearms for the third time, he began to suspect where the trouble lay and thus proceeded to experiment with tussock-moth cocoons. Three different people submitted to a test, that of rubbing the cocoons against the forearm. In each case an itching and burning sensation began within three minutes after the cocoon was applied. This was followed shortly by a distinct swelling which continued to be painful for several hours. After about 24 hours the swelling would subside but red spots were visible on the third day. Two people who submitted to having a small spot on the forearm rubbed by a cocoon, suffered to such an extent that sleep for the following night was considerably disturbed. In all, seven people were tested for the toxic effect from the cocoons and larvae, and in each case swelling and painful results followed. It did not seem necessary to ask a larger number of people to submit to the test in order to prove the poisonous

* Contribution from the Entomological Department of the University of Minnesota.

nature of certain hairs on mature larvae of *Hemerocampa leucostigma* and their cocoons.

A review of the literature in search of information regarding the poisonous nature of the tussock-moth is interesting. Perhaps the first and most incriminating evidence against the tussock-moth is reported by Howard (1896) in which he says: "The barbed hairs just mentioned may occasionally produce considerable irritation of the skin of people upon whom the caterpillars may have crawled or dropped from the trees. The hairs from the different portions of the body of the full-grown caterpillar are illustrated, greatly enlarged, in figure 88, and it is the shorter hairs from the sides which probably cause the irritation. They are very small, fall out readily, and when a caterpillar crawls over the skin of an individual who is warm and perspiring, these very sharply barbed hairs produce an irritation which in some individuals has been the cause of much discomfort, creating more or less inflammation and swelling."

Göldi (1913) reproduces Howard's figures and cites the tussock-moth as the most poisonous of American caterpillars. Apparently, little is said by American authors to support this view. Riley and Johannsen (1915) seem to reflect the general opinion of entomologists in this country when they state: "Göldi (1913) . . . has through some curious misunderstanding featured the larva of *Hemerocampa leucostigma* as the most important of the poisonous caterpillars of this country." Perhaps the real truth regarding the tussock-moth lies along some middle ground.

Kephart (1914) has shown that the brown-tail moth (*Euproctis chrysorrhoea* Linn.) derives its poison from glands situated at the base of certain hairs. The writer believes that similar structures will be found producing poison for the tussock-moth. An investigation of this subject is now under way at the University of Minnesota, and we hope in due course of time that the exact nature of the poison hairs of *Hemerocampa leucostigma* will be made known.

The writer found that the poisonous hairs of the tussock-moth caterpillar are located in the prominent tufts on the dorsal surface. When these tufts were rubbed against the skin, groups of barbed hairs could be seen under the lens, apparently hooked in the pores of the skin. These hairs would break easily and could scarcely be removed by aid of forceps. The flimsy cocoons which this species makes are interwoven with the hairs from the body of the caterpillar, thus the poison hairs still serve to protect the pupa against certain forms of molestation.

There is some indication that the poison glands may not be fully developed until the larva is nearly full-grown. If this were the case it might account for two things: (1) The writer discovered the poisonous nature of the tussock-moth caterpillars at a time when nearly

all were mature and starting to spin cocoons. Younger stages of the larva were difficult to find. Only one half-grown larva was tested for toxic effects, and this one failed to react as did seven or eight mature caterpillars. (2) If the poison is developed only in the late instars of larval life, such might account for the times when people have handled tussock-moth caterpillars without noting any poisonous effects.

Fabre in his "Life of the Caterpillars" gives the results of several experiments with European caterpillars from which he draws the conclusion that it is the excreted products which accumulate on the hairs, or when the same toxin is obtained in concentrated solution from the excrement, which gives a distinctly poisonous reaction when applied to human skin. Fabre evidently believed that all caterpillars which are poisonous, owe that fact to the virus collected on the hairs by rubbing against excrement. He did nothing, however, on the morphology of hair structures which would exclude the possibility that the poison may, even in the species with which he worked, be derived from glands at the base of certain hairs.

While testing old remedies to obtain relief from the poison of the processionary caterpillar, Fabre found that the common garden purslane proved to be a very efficacious palliative. Accordingly, the writer tried purslane (*Portulaca oleracea* L.) as a palliative for the poison of the tussock-moth larva, mashing the leaves into a mucilaginous pulp and applying this to the swollen spots. The relief obtained was surprising. Purslane was then tried as an experiment on three different people who had swellings caused by being rubbed by a tussock-moth cocoon. All were agreed that the relief was very pronounced.

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